

# Claims

[c1] What is claimed is:

1. A method of generating a set of scan diagnostic patterns for diagnosing fails in a set of scan chains comprised of scan chain latches, comprising:

(a) selecting a group of scan chain latches from said set of scan chains, said group of scan chain latches including all or some of said scan chain latches;

(b) selecting a pattern from a set of test patterns;

(c) determining the number of lateral insertions of said selected pattern;

(d) determining a number of new lateral insertions that said selected pattern would add to said set of scan diagnostic pattern and adding said selected pattern and a corresponding new insertion count to a count list;

(e) repeating steps (b) through (d) until all patterns of said set of test patterns have been selected;

(f) selecting a pattern from said count list;

(g) adding said pattern selected from said count list to said set of scan diagnostic patterns; and

(h) repeating steps (b) through (g) until a there are a pre-determined number of patterns in said set of scan diagnostic patterns.

- [c2] 2. The method of claim 1, wherein step (f) selects a pattern from said count list with the highest number of lateral insertions.
- [c3] 3. The method of claim 1, wherein step (f) selects a pattern from said count list that will add the highest number of new lateral insertions to said set of scan diagnostic patterns.
- [c4] 4. The method of claim 1, wherein step (c) includes comparing said selected pattern to a resultant pattern generated by a simulated load/unload sequence of said set of scan chains using said selected pattern to load said scan chain.
- [c5] 5. The method of claim 1, wherein:  
step (d) includes determining said number of new lateral insertions based on the number of new lateral insertions that said selected pattern would add to a mark off list containing all lateral insertions of all patterns in said set of scan diagnostic patterns; and  
step (g) includes adding said new lateral insertions of said pattern selected from said count list to said mark off table.
- [c6] 6. The method of claim 1, wherein step (d) determines the number of new lateral insertions based on lateral in-

sertions of said selected pattern that change the contents of a latch in said set of scan chains from a logical zero to a logical one or from a logical one to a logical zero.

[c7] 7. The method of claim 1, wherein step (d) does not determine the number of new lateral insertions based on lateral insertions of said selected pattern that do not change the logical contents of a latch in said set of scan chains.

[c8] 8. The method of claim 1, wherein said set of scan diagnostic patterns include patterns having lateral insertions that insert a logical zero in latches of said scan chains already containing a logical zero and that that insert a logical one in latches of said scan chains already containing a logical one.

[c9] 9. The method of claim 1, wherein step (b) includes not selecting patterns that have been previously added to said set of scan diagnostic patterns and not selecting patterns that shift scan chains.

[c10] 10. The method of claim 1, wherein said set of patterns is a set of fault patterns.

[c11] 11. A computer system comprising a processor, an address/data bus coupled to said processor, and a com-

puter-readable memory unit adapted to be coupled to said processor, said memory unit containing instructions that when executed by said processor implement of generating a set of scan diagnostic patterns for diagnosing fails in a set of scan chains comprised of scan chain latches, comprising the computer implemented steps of:

- (a) selecting a group of scan chain latches from said set of scan chains, said group of scan chain latches including all or some of said scan chain latches
- (b) selecting a pattern from a set of test patterns;
- (c) determining the number of lateral insertions of said selected pattern;
- (d) determining a number of new lateral insertions that said selected pattern would add to said set of scan diagnostic pattern and adding said selected pattern and a corresponding new insertion count to a count list;
- (e) repeating steps (b) through (d) until all patterns of said set of test patterns have been selected;
- (f) selecting a pattern from said count list;
- (g) adding said pattern selected from said count list to said set of scan diagnostic patterns; and
- (h) repeating steps (b) through (g) until a there are a pre-determined number of patterns in said set of scan diagnostic patterns.

[c12] 12. The system of claim 11, wherein method step (f) se-

lects a pattern from said count list with the highest number of lateral insertions.

[c13] 13. The system of claim 11, wherein method step (f) selects a pattern from said count list that will add the highest number of new lateral insertions to said set of scan diagnostic patterns.

[c14] 14. The system of claim 11, wherein method step (c) includes comparing said selected pattern to a resultant pattern generated by a simulated load/unload sequence of said set of scan chains using said selected pattern to load said scan chain.

[c15] 15. The system of claim 11, wherein method step (d) includes determining said number of new lateral insertions based on the number of new lateral insertions that said selected pattern would add to a mark off list containing all lateral insertions of all patterns in said set of scan diagnostic patterns; and method step (g) includes adding said new lateral insertions of said pattern selected from said count list to said mark off table.

[c16] 16. The system of claim 11, wherein method step (d) determines the number of new lateral insertions based on lateral insertions of said selected pattern that change the

contents of a latch in said set of scan chains from a logical zero to a logical one or from a logical one to a logical zero.

- [c17] 17. The system of claim 11, wherein method step (d) does not determine the number of new lateral insertions based on lateral insertions of said selected pattern that do not change the logical contents of a latch in said set of scan chains.
- [c18] 18. The system of claim 11, wherein said set of scan diagnostic patterns include patterns having lateral insertions that insert a logical zero in latches of said scan chains already containing a logical zero and that that insert a logical one in latches of said scan chains already containing a logical one.
- [c19] 19. The system of claim 11, wherein step (b) includes not selecting patterns that have been previously added to said set of scan diagnostic patterns and not selecting patterns that shift scan chains.
- [c20] 20. The system of claim 11, wherein said set of patterns is a set of fault patterns.